REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)
06/22/01	Final Report	05/01/00 to 12/31/00

4. TITLE AND SUBTITLE

Quantifying Ocean Thermal Variability in the Middle Atlantic Bight

5a. CONTRACT NUMBER
N00014-00-1-0743

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

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Office of Naval Research
Boston Regional Office
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Boston, MA 02210-2109

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for Public Release, Distribution is Unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

As part of the preparations for the Capturing Uncertainty Initiative at ONR, various measures of ocean thermal variability in the vicinity of the shelfbreak front in the Middle Atlantic Bight were calculated. The primary data source was the ONR Shelf-break PRIMER experiment. Some of the results of thermal variability were contrasted with other sources of variability, including a historical climatology and model results.

15. SUBJECT TERMS

ocean thermal variability, Middle Atlantic Bight, shelfbreak front, hydrography

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
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FINAL REPORT
Grant No. N00014-00-1-0743

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Long-Term Goals

The long-term goal of this project was to understand how oceanographic variability affects sound propagation and target detection in the vicinity of a shelfbreak front.

Objectives

The primary objective was to use data from an existing climatology of the shelfbreak front as well as data collected from the shelfbreak PRIMER experiment to calculate the spatial structure of the standard deviation fields of soundspeed in the vicinity of the front.

Approach

High-resolution hydrographic data collected during the summer Shelfbreak PRIMER experiment was used to obtain standard deviation fields in the vicinity of the shelfbreak front. A limitation of this data set is the short temporal duration of the data, and so the resulting standard deviation fields were then compared to standard deviation fields obtained from all available historical hydrographic data within the region.

Tasks Completed

The high-resolution and climatological fields were produced. They were distributed in a timely fashion to other members of the Scientific Advisory committee for the "Capturing Uncertainty in the Tactical Environment" DRI for working on a test problem. The fields were also compared to numerical model results from the group at Harvard University.

Results

The standard deviation fields showed a surprising degree of correspondence between the high-resolution and climatological data sets. The magnitude of the standard deviations was large in terms of soundspeed, with maxima of 15-18 meters per second quite common. The vertical structure varied seasonally, with maximum variations near the surface in the winter and spring and at depths of 20 to 40 m during the summer and autumn.

Impact for Science

The results from this work were useful in helping to formulate the direction of the "Capturing of Uncertainty in the Tactical Environment" DRI, as well as understanding the generality of the results from the Shelfbreak PRIMER experiment to longer time scales. This has important implications for understanding the day to day variability of the Figure of Merit for target detection within shelfbreak regions.

As part of this effort, one submitted manuscript was revised and expanded (Gawarkiewicz *et al.*, 2001) and analysis of the summer PRIMER data set was continued. A manuscript on this is in preparation.

Relationships to Other Programs

Results from this work were used in the "Effects of Sound in the Marine Environment" program. Implications of this work were used in the planning of the ASIAEX field program near the shelfbreak in the South China Sea.

References

Gawarkiewicz, G., F. Bahr, R. Beardsley, and K. Brink, 2001. Interaction of a Slope Eddy with the Shelfbreak Front in the Middle Atlantic Bight. *Journal of Physical Oceanography*, in press.